

Lab-3 Hosting a OpenVPN Server
Final Assignment Option-C
CYBR-8410 Distributed System Security
Name: Deekshith Rao Rangineni

Instances (1/4) Info

Find Instance by attribute or tag (case-sensitive)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 D
	i-0922fa97290794fa3	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	-
	i-0efd3d7e32e3ea08f	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1b	-
	newInstance	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	ec2-52-90-11:
<input checked="" type="checkbox"/>	openvpn-server	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1d	ec2-54-224-7

i-0369d3c3b6f7a0b48 (openvpn-server)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary Info

- **Cloud Provider and Instance Specifications**
- **Cloud Provider:** AWS EC2
- **Instance Type:** t2.micro
- **Operating System:** Ubuntu 20.04 LTS (64-bit)
- **Public IP:** 54.224.71.202
- **Security Group Rules:**
 - SSH (TCP port 22): Enabled for my IP
 - OpenVPN (UDP port 1194): Enabled for all IPs (0.0.0.0/0)

Instance summary for i-0369d3c3b6f7a0b48 (openvpn-server) Info

Updated 34 minutes ago

Instance ID i-0369d3c3b6f7a0b48	Public IPv4 address 54.224.71.202 open address	Private IPv4 addresses 172.31.31.23
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-54-224-71-202.compute-1.amazonaws.com open address
Hostname type IP name: ip-172-31-31-23.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-31-23.ec2.internal	Elastic IP addresses -
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. Learn more
Auto-assigned IP address 54.224.71.202 [Public IP]	VPC ID vpc-06b51fd945fea4e23	Auto Scaling Group name -
IAM Role -	Subnet ID subnet-0fcb3383ffa4ed906	Managed false
IMDSv2 Required	Instance ARN arn:aws:ec2:us-east-1:504172982374:instance/i-0369d3c3b6f7a0b48	
Operator -		

This my Instance Summary For the openvpn-server

```

PS C:\Users\deeks\Downloads> ssh -i '.\labsuser.pem' ubuntu@54.224.71.202
The authenticity of host '54.224.71.202 (54.224.71.202)' can't be established.
ED25519 key fingerprint is SHA256:7JDC0tT/tI6NrFEFI/4Umzs+sYPvmNe7Vv5JEWSiiJw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.224.71.202' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1024-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Wed May  7 23:17:19 UTC 2025

System load:  0.02               Processes:            106
Usage of /:   21.8% of 7.57GB    Users logged in:     0
Memory usage: 20%               IPv4 address for eth0: 172.31.31.23
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

```

Connected to EC2 via SSH using the key file from my PC

```

The list of available updates is more than a week old.
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individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-31-23:~$

```

Successfully connected to the Ubuntu

```
ubuntu@ip-172-31-31-23:~$ wget https://git.io/vpn -O openvpn-install.sh
--2025-05-07 23:18:17-- https://git.io/vpn
Resolving git.io (git.io)... 140.82.114.21
Connecting to git.io (git.io)[140.82.114.21]:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh [following]
--2025-05-07 23:18:17-- https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)[185.199.109.133]:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh [following]
--2025-05-07 23:18:17-- https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)[185.199.109.133]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24807 (24K) [text/plain]
Saving to: 'openvpn-install.sh'

openvpn-install.sh      100%[=====] 24.23K  --.-KB/s  in 0s

2025-05-07 23:18:17 (138 MB/s) - 'openvpn-install.sh' saved [24807/24807]
```

Downloaded the OpenVPN install script using:

wget <https://git.io/vpn -O openvpn-install.sh>

Ran the script to install OpenVPN and set it up.

chmod +x openvpn-install.sh

sudo ./openvpn-install.sh

```
ubuntu@ip-172-31-31-23: ~ × + v
Welcome to this OpenVPN road warrior installer!

This server is behind NAT. What is the public IPv4 address or hostname?
Public IPv4 address / hostname [54.224.71.202]: |
```

The script detected that the server is behind a NAT and asked for the public IP address clients will connect to. It auto-filled the correct public IP (54.224.71.202), so I just pressed Enter to continue.

```

Welcome to this OpenVPN road warrior installer!

This server is behind NAT. What is the public IPv4 address or hostname?
Public IPv4 address / hostname [54.224.71.202]:

Which protocol should OpenVPN use?
  1) UDP (recommended)
  2) TCP
Protocol [1]:

What port should OpenVPN listen on?
Port [1194]:

Select a DNS server for the clients:
  1) Default system resolvers
  2) Google
  3) 1.1.1.1
  4) OpenDNS
  5) Quad9
  6) AdGuard
  7) Specify custom resolvers
DNS server [1]: 2

Enter a name for the first client:
Name [client]: deekshith

```

Selected configuration options:

- Protocol: UDP
- DNS: Google
- Client name: deekshith

```

OpenVPN installation is ready to begin.
Press any key to continue...
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2311 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2556 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [415 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [18.5 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [3485 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [620 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [676 B]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1202 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [297 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [28.7 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [46.5 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.8 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [592 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [68.8 kB]

```

Downloaded and executed OpenVPN install Script

```

Check that the request matches the signature
Signature ok
The Subject's Distinguished Name is as follows
commonName            :ASN.1 12:'deekshith'
Certificate is to be certified until May  5 23:21:58 2035 GMT (3650 days)

Write out database with 1 new entries
Data Base Updated

Notice
-----
Inline file created:
* /etc/openvpn/server/easy-rsa/pki/inline/private/deekshith.inline

Notice
-----
Certificate created at:
* /etc/openvpn/server/easy-rsa/pki/issued/deekshith.crt

Using configuration from /etc/openvpn/server/easy-rsa/openssl-easyrsa.cnf

Notice
-----
An updated CRL DER copy has been created:
* /etc/openvpn/server/easy-rsa/pki/crl.der

An updated CRL has been created:
* /etc/openvpn/server/easy-rsa/pki/crl.pem

IMPORTANT: When the CRL expires, an OpenVPN Server which uses a
CRL will reject ALL new connections, until the CRL is replaced.

Created symlink /etc/systemd/system/multi-user.target.wants/openvpn-iptables.service → /etc/systemd/system/openvpn-iptables.service.
Created symlink /etc/systemd/system/multi-user.target.wants/openvpn-server@server.service → /lib/systemd/system/openvpn-server@.service.

Finished!

The client configuration is available in: /home/ubuntu/deekshith.ovpn
New clients can be added by running this script again.

```

The VPN setup script successfully created the certificate and client configuration file for deekshith. It saved the final .ovpn file in /home/ubuntu, ready to be used for connecting to the VPN.

```

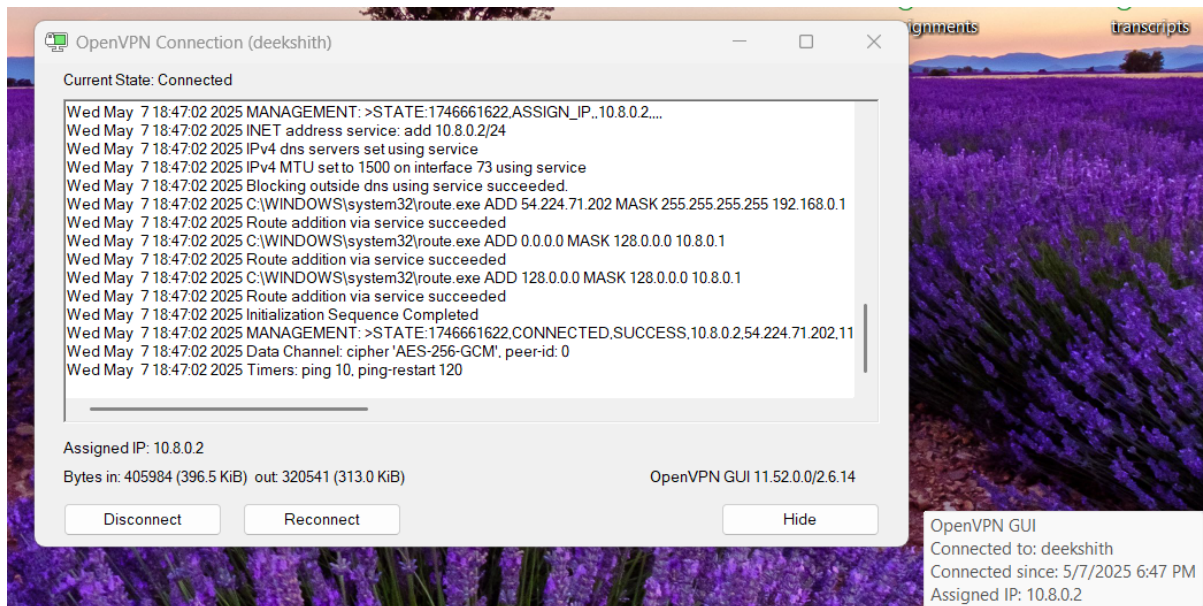
ubuntu@ip-172-31-31-23:~$ sudo find / -name "*.ovpn"
/home/ubuntu/deekshith.ovpn
ubuntu@ip-172-31-31-23:~$ exit
logout
Connection to 54.224.71.202 closed.
PS C:\Users\deeks\Downloads> scp -i .\labsuser.pem ubuntu@54.224.71.202:/home/ubuntu/deekshith.ovpn .
deekshith.ovpn
PS C:\Users\deeks\Downloads> |
100% 4980  48.6KB/s  00:00

```

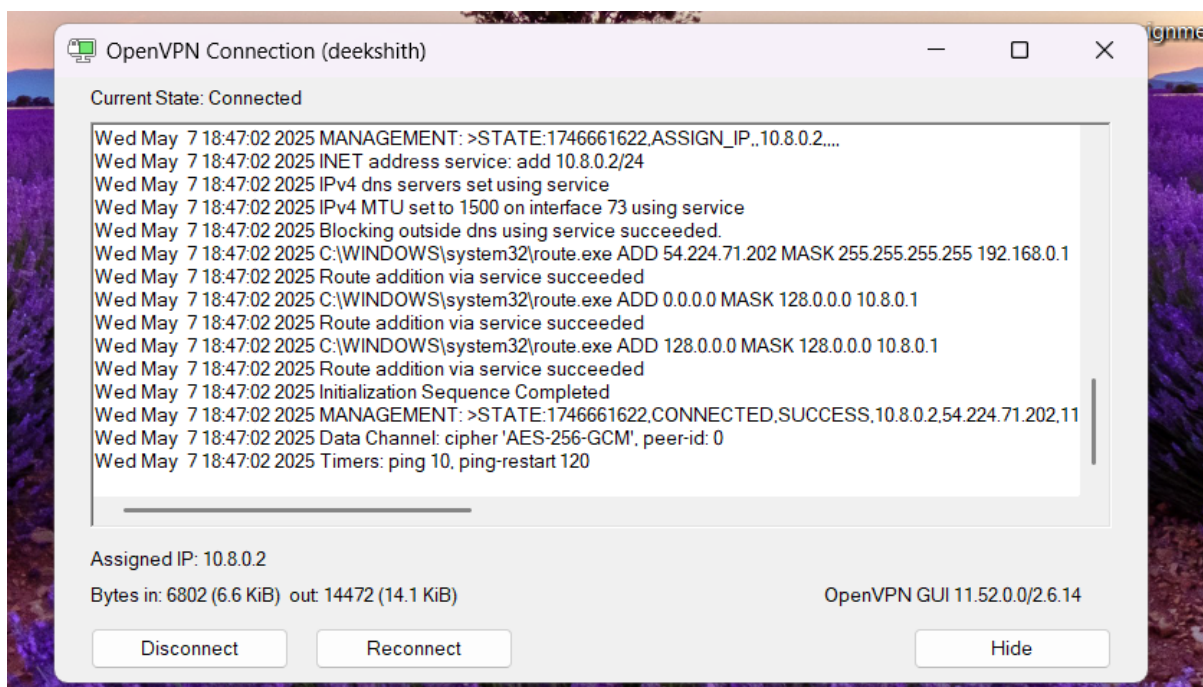
The script generated a file called deekshith.ovpn, which I securely copied to my computer using:

scp -i labsuser.pem ubuntu@54.224.71.202:/home/ubuntu/deekshith.ovpn .

Now installed the OpenVPN GUI and Run It as a Administrator



So after running it I saw at the bottom vpn was installed then I connected it ti the deekshith open vpn file successfully as you can see in the screenshot



Here is the other screenshot of the VPN connected successfully.

The screenshot shows the homepage of whatismyipaddress.com. At the top, there is a search bar with the text "Enter Keywords or IP Address..." and a "Search" button. Navigation links include "ABOUT", "PRESS", "PODCAST", and "SUPPORT". Below the navigation bar, there are tabs for "MY IP", "IP LOOKUP", "HIDE MY IP", "VPNS", "TOOLS", and "LEARN". A purple banner with the text "READY TO TALK ABOUT PAIN WITH YOUR DOCTOR?" is displayed. The main content area shows the user's IP address information:

- My IP Address is:
 - IPv6: **2600:8804:1387:bc00:31d0:9c83:e90f:2e52**
 - IPv4: **68.13.132.176**
- My IP Information:
 - ISP: Cox Communications LLC
 - City: Omaha
 - Region: Nebraska
 - Country: United States
- Your location may be exposed!
 - [HIDE MY IP ADDRESS NOW](#)
 - [Show Complete IP Details](#)
- Location not accurate?
 - [Update My IP Location](#)

A map on the right shows the location near Omaha, Nebraska.

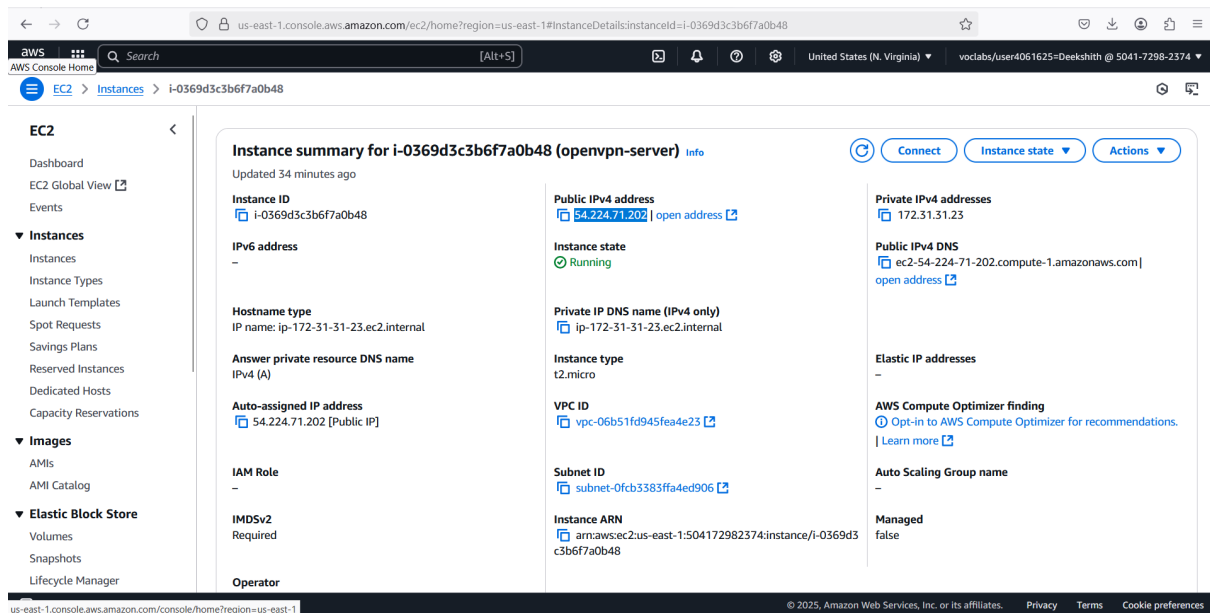
To test whether the VPN was working, I used the website whatismyipaddress.com to check my IP address before and after connecting. This was before connecting to the VPN my regular home IP address Showed Up

The screenshot shows the homepage of whatismyipaddress.com after connecting to a VPN. The main content area shows the user's IP address information:

- My IP Address is:
 - IPv4: **54.224.71.202**
 - IPv6: **2600:8804:1387:bc00:31d0:9c83:e90f:2e52**
- My IP Information:
 - ISP: Amazon Technologies Inc.
 - City: Ashburn
 - Region: Virginia
 - Country: United States
- Are you using a VPN?
 - [RATE YOUR VPN](#)
 - [Show Complete IP Details](#)
- Location not accurate?
 - [Update My IP Location](#)

A map on the right shows the location near Washington, Virginia. A banner at the top reads "PATH TO SUCCESS" with a "LEARN MORE" button.

**After connecting to VPN It showed the AWS server's public IP:
54.224.71.202**



So, my public IP address Was shown in The Website As you can see it in My Instance Summary this proves that all my traffic was being routed through the VPN tunnel. I also conformed connection through the OpenVPN GUI window, which displayed

Conclusion:

The OpenVPN setup on AWS was successful. I was able to install and configure the VPN server, generate a client profile, connect from my windows computer, and verify encrypted traffic by confirming my IP address changed. This hands-on project helped me understand secure communication and tunnelling in distributed systems.